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(71) Applicant: OPEN TV, INC. [US/US]; 401 East Middlefield Road, Mountain View, CA 94043 (US).		
(72) Inventor: ZDEPSKI, Joel; 470 Levin Avenue, Mountain View, CA 94043 (US).		<b>Published</b> <i>With international search report.</i>
(74) Agent: YI, Susan, C.; Ritter, Van Pelt & Yi, Suite 205, 4906 El Camino Real, Los Altos, CA 94022 (US).		

**(54) Title:** SYSTEM AND METHOD FOR ONE-TOUCH E-MAIL REPLY**(57) Abstract**

The present invention relates to a simplified electronic message response, such as an electronic mail (e-mail) response. According to an embodiment of the present invention, there is an interactive television system that includes a television (112) coupled to an user interface (102) and a set top box (110), whereas the set box is coupled with an Internet Service Provider (106). A sender may send an electronic message, such as an e-mail, that includes a main message and one or more options. The receiver may select any of the options, for example, pressing a number on a remote control that corresponds to an option. Once an option has been selected, information related to the selected option, such as text explaining the selected option to the user, may be presented. The user can then indicate a desire to transmit the selected option. A reply e-mail is automatically generated and sent to the original sender, such as the advertiser.

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## SYSTEM AND METHOD FOR ONE-TOUCH E-MAIL REPLY

FIELD OF THE INVENTION

This invention is related to electronic messages. In particular, the invention is related to  
5 sending and receiving electronic messages in a system with limited input capabilities, such as an interactive television system.

RELATED APPLICATIONS

10 This application claims priority to U.S. Provisional Patent Application Serial No. 06/081,095, filed 04/08/98, entitled, “*System and Method for Sending and Receiving E-mail Via a Television*”, and U.S. Provisional Patent Application No. 60/081,046, filed April 8, 1998, entitled, “*System and Method for One-Touch E-Mail Reply*”, both of which are herein incorporated by reference.

15

BACKGROUND OF THE INVENTION

A frequent goal of the commercial use of the Internet is to generate revenues for the companies utilizing the Internet. The complexity of this problem may be compounded by a user interface system that limits user input. For example, a user utilizing e-mail access via an  
20 interactive television system may be limited to a remote control as the primary user input device. Without a keyboard, user input may be limited to the numerical and directional keys typically provided on the television remote control.

An advertisement on the Internet is often passive, only conveying information to direct the reader to take action to order the advertised products. However, the effectiveness of these

advertisements would likely be improved if the reader could simply and easily order a product at the time the reader surveys the advertisement.

It would be desirable to have a system and method for sending and replying to electronic messages, such as advertisements, so that a simple input from the reader would indicate a selection, such as a purchase of a selected product. The present invention addresses such a need.

5

SUMMARY OF THE INVENTION

The present invention relates to a simplified electronic message response, such as an electronic mail (e-mail) response. According to an embodiment of the present invention, a sender may send an electronic message, such as an e-mail, that includes a main message and one or more options. The electronic message is received by a user. The main message with the one or more options is presented to the user. The user may select any of the options, for example, by pressing a number on a remote control that corresponds to an option. Once an option has been selected, information related to the selected option, such as text explaining the selected option to the user, may be presented. According to an embodiment of the present invention, this text is preferably unalterable by the user. The user can then indicate a desire to transmit the selected option. A reply e-mail is automatically generated and sent to the original sender, such as the advertiser. If the displayed option is not selected, than the original receiver may select another option by pressing a number corresponding to one of the options. If the displayed option is selected, then the reply e-mail is sent back to the original sender. According to an embodiment of the present invention, identification of the selected option may be included in the header so that the original sender does not need to open the reply message in order to determine which option was selected.

A method according to an embodiment of the present invention for responding to an electronic message is presented. The method comprises presenting a main message with at least one option; determining whether the at least one option was selected; presenting information related to the selected option; and determining whether the selected option is to be transmitted.

A method according to an embodiment of the present invention for sending an electronic message is also presented. The method comprises providing a main message; providing at least one option; providing information related to the at least one option, wherein the information is to

be presented after the at least one option has been presented and after the at least one option has been selected; and transmitting the electronic message.

A system according to an embodiment of the present invention for responding to an electronic message is also presented. The system comprises a processor configured to present a main message with at least one option; determine whether the at least one option was selected; present information related to the selected option; and determine whether the selected option is to be transmitted. The system also includes a memory coupled with the processor, wherein the memory is configured to provide instructions to the processor.

A system according to an embodiment of the present invention for sending an electronic message is also presented. The system comprises a processor configured to provide a main message; provide at least one option; provide information related to the at least one option, wherein the information is to be presented after the at least one option has been presented and after the at least one option has been selected; and transmit the electronic message. The system also includes a memory coupled with the processor, the memory being configured to provide the processor with instructions.

BRIEF DESCRIPTION OF THE DRAWINGS

Figures 1A – 1B illustrate examples of systems suitable for implementing an embodiment of the present invention.

5 Figure 2 is a block diagram of an interactive television system suitable for implementing an embodiment of the present invention.

Figures 3A – 3B are flow diagrams of a method according to an embodiment of the present invention for providing E-mail functionality.

10 Figure 4 is a flow diagram of a method according to an embodiment of the present invention for formatting a header.

Figure 5 is a flow diagram of a method according to an embodiment of the present invention for formatting a message prior to display.

Figure 6 is a flow diagram of a method according to an embodiment of the present invention for sending E-mail.

15 Figure 7 is an illustration of an example of a format of an e-mail message designed for an e-mail reply according to an embodiment of the present invention.

Figure 8 is an example of a series of short options which may be displayed to a reader according to an embodiment of the present invention.

20 Figures 9A – 9B are flow diagrams of the method according to an embodiment of the present invention for an e-mail reply system.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The following description is presented to enable one of ordinary skill in the art to make and to use the invention and is provided in the context of a patent application and its requirements. Various modifications to the preferred embodiments will be readily apparent to those skilled in the art and the generic principles herein may be applied to other embodiments. Thus, the present invention is not intended to be limited to the embodiment shown but is to be accorded the widest scope consistent with the principles and features described herein.

Figures 1A – 1B show examples of an E-mail system suitable for implementing an embodiment of the present invention. Figure 1A shows an example of a limited resource E-mail system, such as an interactive television system. The interactive television system is shown to include a television 112 coupled with a user interface 102 and a set top box 110. Examples of the user interface 102 include a remote control, a keyboard, or a mouse. The set top box 110 may be any standard set top box, such as the set top box manufactured by Echostar. The set top box 110 is shown to be coupled with an Internet service provider 106. Examples of an Internet service provider include Netcom, and America On Line. The Internet service provider (ISP) 106 is also shown to be coupled with the Internet 104. A proxy server 110 and an E-mail server 112 are coupled with each other as well as with the Internet 104. According to an embodiment of the present invention, E-mail may be sent and received by the set top box 110 through the ISP 106, the Internet 104, and the proxy server 110. The proxy server 110 may be an ISP 106 proxy server coupled to the E-mail server 112. Alternatively, the proxy server 110 may be a non-ISP 106 proxy server. For example, the proxy server 110 may be a corporation's proxy server that is connected to the corporation's E-mail server 112. In either case, the proxy server 110 may access the E-mail server 112 to retrieve or send E-mails.

The system illustrated in Figure 1B is similar to that shown in Figure 1A except that the set top box 110' is coupled to the ISP 106' through the Internet 104'. Additionally, the ISP 106' includes a proxy server 110' and an E-mail server 112' coupled together.

Figure 2 is a block diagram of an example of a set top box, such as set top box 110 and 5 110' shown in Figures 1A – 1B, suitable for implementing an embodiment of the present invention. The set top box 110 shown in Figure 2 is shown to be coupled with a receiving antenna 108 and a television 112. A signal received by the receiving antenna 108 is sent to a front end 200 which converts analog signals received from the receiving antenna 108 to a digital signal. The signals are then sent from the front end 200 to a micro-controller 202. The micro-10 controller 202 may also be referred to as a processor. The micro-controller may include a hardware filter, such as a private data stream (PDS) filter 204. The PDS filter 204 may select packets out of the packet stream of the received signal. Digital video signals and digital audio signals are then sent to a digital-to-analog converter 210. There may be a digital-to-analog conversion for video as well as for audio.

15 The micro-controller 202 is also shown to be coupled with a FLASH memory 206 and a system random access memory (RAM) 208. Programs which are run by the micro-controller 202 may be located in the FLASH memory 206 or RAM 208, while other information, such as a database, may be located in the system RAM 208. The micro-controller 202 is also optionally coupled with a modem 250 to provide access to networks such as cable or telephone.

20 The digital-to-analog converter 210 is also shown to be coupled with a memory for decompression 214 which may be utilized in decompressing compressed signals. The digital-to-analog converter 210 is also shown to be coupled with a remodulator 212 which can remodulate audio and video signals for proper format to be displayed on the television 112.

Figures 3A – 3B are flow diagrams of a method according to an embodiment of the 25 present invention for providing an E-mail function. The E-mail function is started in the resource-limited system, such as the set top box (step 300), and a user name and password is

provided (step 302). A connection to a proxy server, such as proxy server 110 or 110' of Figures 1A – 1B, is then made (step 304). The proxy server then connects to an E-mail server, such as the E-mail server 112 and 112' of Figures 1A – 1B, and logs in (step 306).

A request for a message header is sent from the proxy server to the E-mail server with a  
5 user name and password (step 308). For example, the request may be in HTTP format. An E-mail message typically includes a header and a body. The header may include information such as subject, date, from, to, blind copy (bc), and carbon copy (cc). The body of the E-mail message typically contains the actual text of the message. Assuming there is a message waiting for that particular user, the proxy server then retrieves a message header from the E-mail server without  
10 any additional formatting to the header (step 310). Accordingly, the proxy server retrieves the header from the E-mail server in text string format.

The proxy server sends the header to the set top box without additional formatting (step 312). Accordingly, the set top box receives the header in the same text string format that was stored in the E-mail server. Thereafter it is determined whether the user has E-mail (step 350).  
15 If the user has no E-mail, then the proxy server would not be able to retrieve headers from the E-mail server, thus the proxy server would not transfer the headers to the user. If the user does not have any E-mail, then the E-mail system would disconnect (step 352). If, however, the user does have E-mail, then the received header is formatted into an internal data structure (step 354). Further details of formatting the header will later be discussed in conjunction with Figure 4. The  
20 E-mail header is then displayed on a display, such as a television (step 356).

A request for the E-mail body is then sent to the proxy server (step 358). The proxy server then retrieves the E-mail message from the E-mail server (step 560). In the meantime, the user selects a header (step 362). Assuming that the E-mail body has been received from the proxy server, the selected E-mail message is then internally formatted (step 364). Further details  
25 of the internal formatting of the message will later be discussed in conjunction with Figure 5.

The internal formatting of the E-mail message is generally for the purpose of displaying it on the display screen or television screen. The purpose of formatting the header is also to format it on display on the display. Once the E-mail message is internally formatted, the E-mail message may be displayed associated with a selected header (step 366).

5 Figure 4 is a flow diagram of a method according to an embodiment of the present invention for formatting an E-mail header, such as the formatting recited in step 354 of Figure 3B. The primary purpose of formatting the E-mail header is to format the header for display. As previously mentioned, the E-mail header may include information such as subject, date, from, to, etc. This information may be organized in an unknown order such that some formatting of the  
10 header information may be required. The flow diagram in Figure 4 shows an example of such internal formatting. For example, it is determined whether the text string "date" is found in the header (step 400). If "date" is found in the header, the date is stored, for example, for the set top box (step 402). It may then be determined whether various other information is found in the header, for example, it is determined whether the subject is found in the header (step 404). If so,  
15 then the subject is stored (step 406). Likewise, it may be determined whether the text string "from" is found in the header (step 408), and if so, store the "from" information (step 410). It may also be determined whether the text string "to", "message ID", and "reply to" are found in the header (steps 412, 416, 420), and if so, they are stored (steps 414, 418, and 422). Although  
20 the example shown in Figure 4 is ordered in a particular manner, the header may be formatted in any particular predetermined order for display.

Figure 5 is a flow diagram of a method according to an embodiment of the present invention for formatting an E-mail message prior to displaying the message, such as in step 364 of Figure 3B. The message header may be requested and received again (step 500). The plain text of the message body is then formatted to fit the screen (step 502). This formatting allows the  
25 text to be displayed without the need to scroll side to side. It is then determined whether there is an attachment to the message (step 504). If there is no attachment to the message, then the plain

text of the message is displayed (step 506). If, however, there is an attachment to the E-mail message, then it is determined whether the set top box is capable of handling this type of an attachment (step 508). For example, if a Microsoft word document is received as an attachment to the E-mail message, but if the set top box of the interactive television system does not provide 5 Microsoft word functionality, then the set top box would not be capable of handling this type of attachment. If the set top box is incapable of handling this type of attachment, then the attachment is truncated (step 510). The plain text of the main message is then displayed with a notification of the truncation of the attachment (step 514).

If the set top box is capable of handling this type of attachment (step 508), then the 10 software that can display such an attachment is called (step 512). For example, an attachment may need a word processing program or a database management program to be viewed. Thereafter, the plain text of the E-mail message and the attachment is displayed (step 516).

Figure 6 is a flow diagram of the method according to an embodiment of the present 15 invention for sending an E-mail. A user requests an E-mail composition (step 600). The user's typing/editing then received (step 602). A connection is made to the proxy server for sending E-mail (step 604). The message header and body of the E-mail message is then sent to the proxy server (step 606). The proxy server then connects to the E-mail server and sends the E-mail (step 608).

Figure 7 is an illustration of an e-mail according to an embodiment of the present 20 invention. The example shown in Figure 7 is the formatting of an e-mail to be sent to a user. This e-mail may accept a simple input by the user that triggers an automatic generation of a response message to the sender. In this example, the original message includes an indicator 700A, such as < One Touch E-mail >, that indicates that information following the indicator 700A are expected to include at least one option. There may be multiple sections within the text 25 describing a given option. For example, one section may explain the option, while another

section may include text prepared in advance to be incorporated into a reply message that may be sent back to the sender.

For example, a first short option indicator 702A may be used to identify the first option in a brief manner. After the first short option indicator 702A, text describing the first option may 5 be inserted. The text describing the first option is herein referred to as the first long option 701A. An end first option indicator 702B may be used to indicate the end of text related to the first option. Thereafter, a second short option indicator 704A may be used to identify the second option. The text following this indicator 704A may be a more detailed description related to the second option. The text describing the second option is herein referred to as the second long 10 option 701B. After the second long option 701B, an end second option indicator 704B may be inserted to indicate the end of the text related to the second option. Additional options may be defined, as desired. Once all of the options have been created, an end option indicator 700B may be used to indicate the end of all of the options.

The indicators 700A – 704A, and 700B – 704B, may be any demarcation, such as text or 15 symbol, that the programmer may choose to use as an indicator. For example, a phrase, such as “<one touch e-mail>” may be used as a beginning indicator 700A, while a “/” in front of the same phrase, such as “</ one touch e-mail>”, may be used for an end indicator 700B, 702B and 704B. One example of creating the indicators 700A-704A and 700B-704B is by using extended 20 markup language (XML).

In the example shown in Figure 7, the text of the e-mail message is shown to be inserted after the set of options. However, the text of the main e-mail message may also be positioned prior to the set of options.

Figures 8A – 8B illustrate an example of an e-mail message according to an embodiment of the present invention. An e-mail message created in the format exemplified in Figure 7 can be

displayed to a receiver of the e-mail message, herein referred to as a user, as shown in Figure 8A. The main text of the e-mail message can be displayed along with the set of short options. For example, the text may be an advertisement for ten special edition books which may be purchased by the reader, while the set of options may be the titles of ten different special edition books that 5 may be purchased by the reader.

The user may select a short option by pressing a key, or navigating a menu, corresponding to the short option. For example, the short options may have a corresponding number, for example, one through ten. The e-mail receiver may press a corresponding number on a user input device, such as a television remote control device, that corresponds to a number 10 associated with a selected short option. When a short option is selected, the e-mail receiver may view another screen, such as that shown in Figure 8B. For example, if the initial message is an advertisement for special edition books, and the e-mail receiver selects short option number three which may be a title to an offered book, such as "Gone With The Wind", then the e-mail receiver may see further text describing the selected option, such as a book jacket description of 15 "Gone With The Wind". This longer description of the option may be presented to the e-mail receiver in a reply e-mail message addressed to the advertiser, for example the book club company which initially sent the advertising e-mail. The header in such a reply e-mail may indicate which option has been selected so that the sender of the advertisement may note the selected purchase order without opening the returned e-mail. For example, in the "RE" section 20 of a header, the option title, such as "Gone With The Wind", or the option number, maybe indicated.

Alternatively, rather than or in addition to the longer description, pieces of code may also be sent to the receiver so that the receiving machine may run the code. For example, when a short option is selected, animation, such as a dancing baby, may be presented as, or as part of, the 25 longer description.

In addition to the text describing the selected option, further instructions to the e-mail receiver may also be displayed. For example, an instruction to press another number for a corresponding option may be displayed, or an instruction such as "press send to send this order" or "press zero to send this order", may also be displayed.

5 Figures 9A – 9B are flow diagrams of the method according to an embodiment of the present invention for an electronic message reply system, such as an e-mail reply system. An e-mail is received (step 900), and it is determined whether this e-mail is a predetermined type of e-mail, such as an e-mail of a type named one touch e-mail (step 902). If this e-mail is not the predetermined type of e-mail, then the e-mail is displayed as a normal e-mail (step 904). If, 10 however, this is a predetermined type of e-mail, then each "short" option is formatted (step 906). The short option is formatted for display. For example, the short option may be formatted to be displayed together along with the main e-mail message, as shown in the example of Figure 8A.

15 Each short option is then assigned a number (step 908). The main message of the e-mail is then displayed (step 910). All numbered short options are also displayed (step 912). It is then determined whether an option is selected (step 914). If an option is not selected, then the numbered short options are continued to be displayed (step 912). If, however, an option is selected (step 914), then the predetermined text associated short option (display long option) is displayed (step 918).

20 The text user input may be disabled while allowing numeric key functions to remain enabled (step 920). A user input is then received (step 922). It is then determined whether the current option is selected for sending an order to the original message sender (step 924). The determination of whether to send the current message depends on what user input was received. For example, the current message may be sent if the user presses a send button.

If the current message is not to be sent, then it is determined whether a valid option has been selected (step 926). If a valid option has not been selected, then the system continues to wait to receive another user input. If, however, a valid option has been selected, then the long option associated with the newly selected option is then displayed (step 930).

5        If the current option is selected to send a message back to the original sender of the message (step 924), then a reply message identifying the selected option is created to be sent back to the original sender (step 927). The created message is sent back to the user with the selected option (step 928). The selected option may be identified in the header of the current message being sent back to the sender so that the sender may identify the selection without  
10        having to open up the message. The original sender then receives the reply (step 932).

A method and system for a simple e-mail reply system has been disclosed. Software written according to the present invention may be stored in some form of computer-readable medium, such as memory or CD-ROM, or transmitted over a network, and executed by a processor.

15        Although the present invention has been described in accordance with the embodiment shown, one of ordinary skill in the art will readily recognize that there could be variations to the embodiment and these variations would be within the spirit and scope of the present invention. For example, although the examples herein use e-mail, any electronic message may be used, such as voice, video, text, or any combination thereof. Alternatively, a piece of code may be  
20        sent to the receiver. For example, code may be received by the receiving device, interpreted, and produce a message to be presented to the receiver. Examples of such a message include a text message, video message, voice message, or a multimedia message. Accordingly, many modifications may be made by one of ordinary skill in the art without departing from the spirit and scope of the appended claims.

CLAIMS

*What is claimed is:*

1. A method for responding to an electronic message comprising:

presenting a main message with at least one option;

5 determining whether the at least one option was selected;

presenting information related to the selected option; and

determining whether the selected option is to be transmitted.

2. The method of claim 1, wherein the at least one option is selected by using a remote

10 control device.

3. The method of claim 1, wherein the at least one option is selected by selecting a first number on a remote control device, wherein the first number corresponds to a second number related to the at least one option.

15

4. The method of claim 1, wherein an electronic message identifying the selected option is automatically generated to be sent if the selected option is determined to be transmitted.

5. The method of claim 4, wherein the electronic message is unalterable by a user.

20

6. The method of claim 1, further comprising determining whether a second option has been selected if it is determined that the selected option is not to be transmitted.

25 7. The method of claim 6, wherein the second option is selected by selecting a key on a remote control device, wherein the key corresponds to the second option.

8. The method of claim 7, wherein the key represents a number corresponding to a number associated with the second option.

9. The method of claim 1, wherein the selected option is identified in a header of a message if the selected option is to be transmitted.

10. A method for sending an electronic message comprising:

5 providing a main message;

providing at least one option;

providing information related to the at least one option, wherein the information is to be presented after the at least one option has been presented and after the at least one option has been selected; and

10 transmitting the electronic message.

11. The method of claim 10, wherein the at least one option is to be selected by using a remote control device.

15 12. The method of claim 10, wherein the at least one option is to be selected by selecting a first number on a remote control device, wherein the first number corresponds to a second number related to the at least one option.

20 13. The method of claim 12, wherein the at least one option is to be identified in an automatically generated reply message if the at least one option is selected.

14. The method of claim 13, wherein the selected option is identified in a header of the reply message if the selected option is to be transmitted.

25 15. The method of claim 13, wherein the automatically generated reply message is unalterable by a user.

16. A system for responding to an electronic message comprising:

30 a processor configured to present a main message with at least one option; determine whether the at least one option was selected; present information related to the selected option; and determine whether the selected option is to be transmitted; and

a memory coupled with the processor, wherein the memory is configured to provide instructions to the processor.

17. A system for sending an electronic message comprising:

5 a processor configured to provide a main message; provide at least one option; provide information related to the at least one option, wherein the information is to be presented after the at least one option has been presented and after the at least one option has been selected; and transmit the electronic message; and

a memory coupled with the processor, the memory being configured to provide the processor with instructions.

10 18. A computer program product for responding to an electronic message comprising:

computer code presenting a main message with at least one option;

computer code determining whether the at least one option was selected;

computer code presenting information related to the selected option;

computer code determining whether the selected option is to be transmitted; and

15 a computer readable medium that stores the computer codes.

19. The computer program product of claim 18, wherein the computer readable medium is

selected from the group consisting of CD-ROM, floppy disk, tape, flash memory, system

memory, hard drive, and data signal embodied in a carrier wave.

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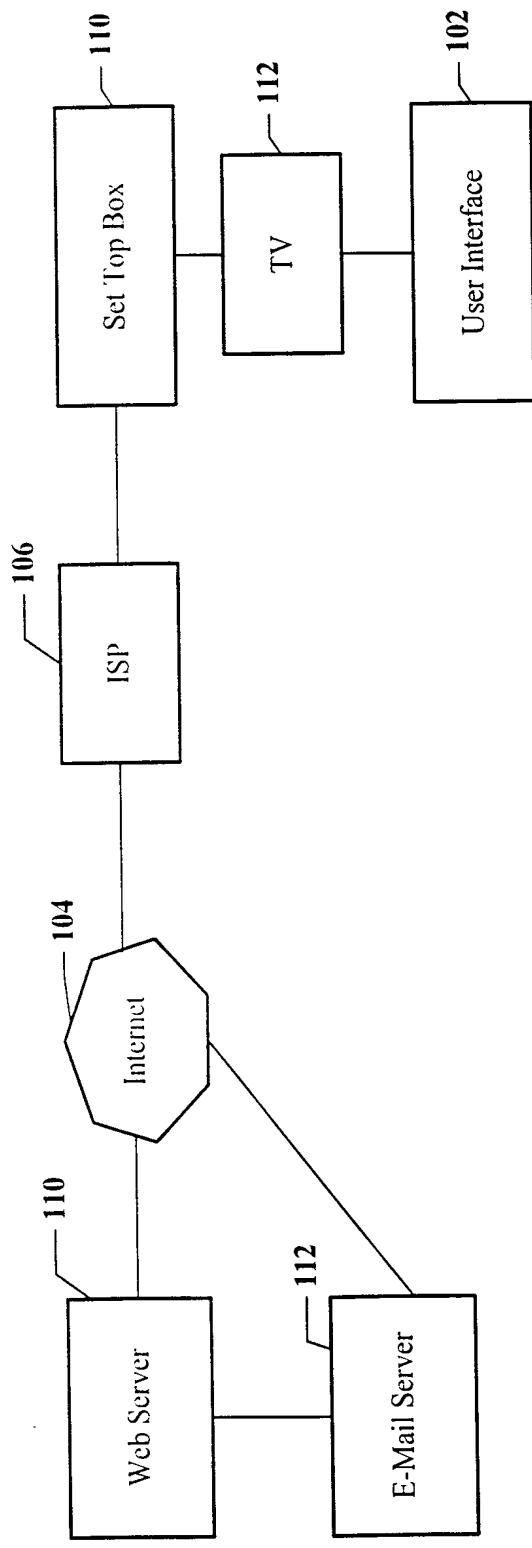


Figure 1A

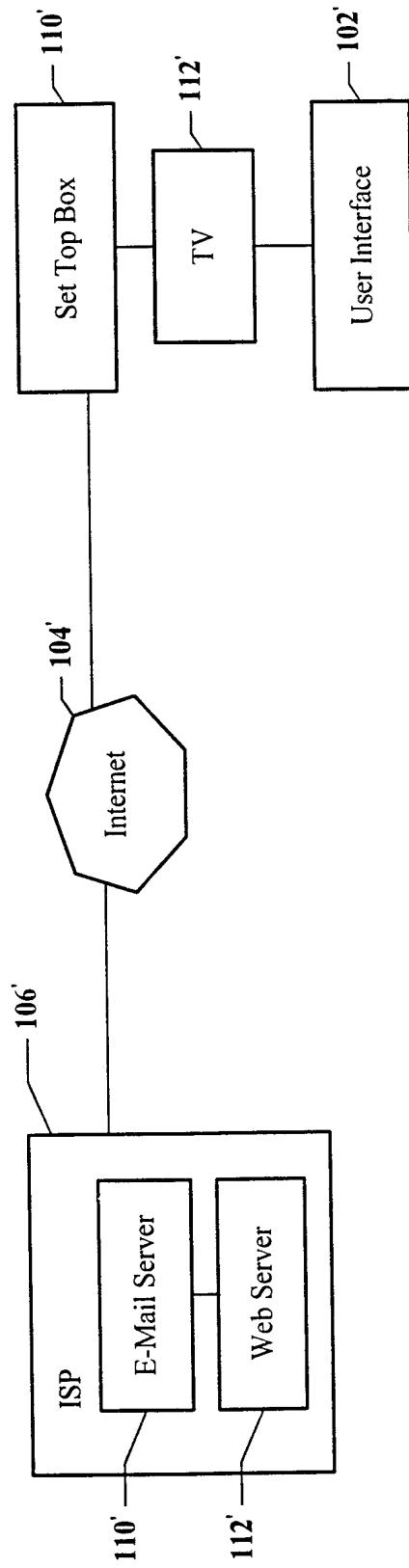


Figure 1B

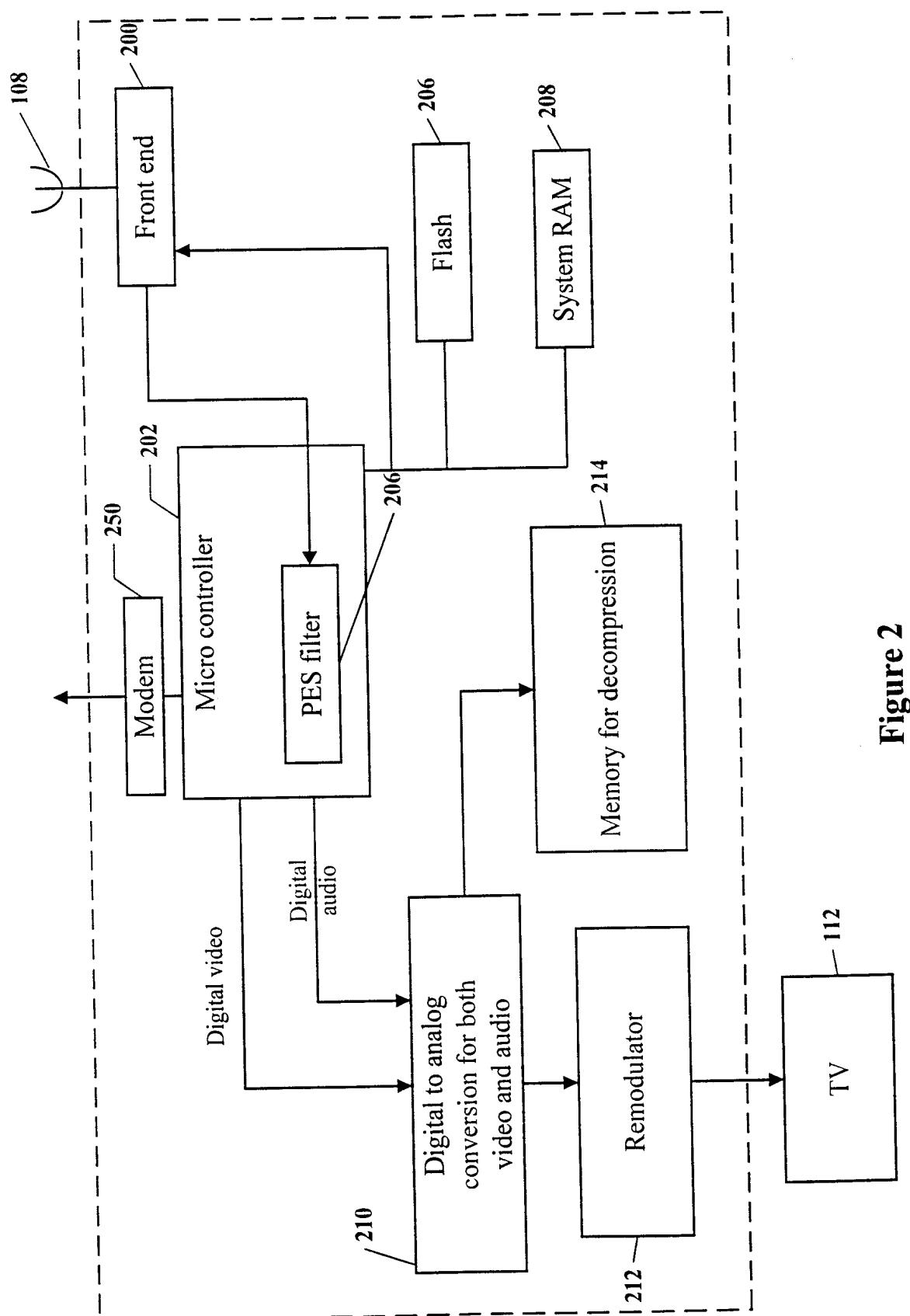


Figure 2

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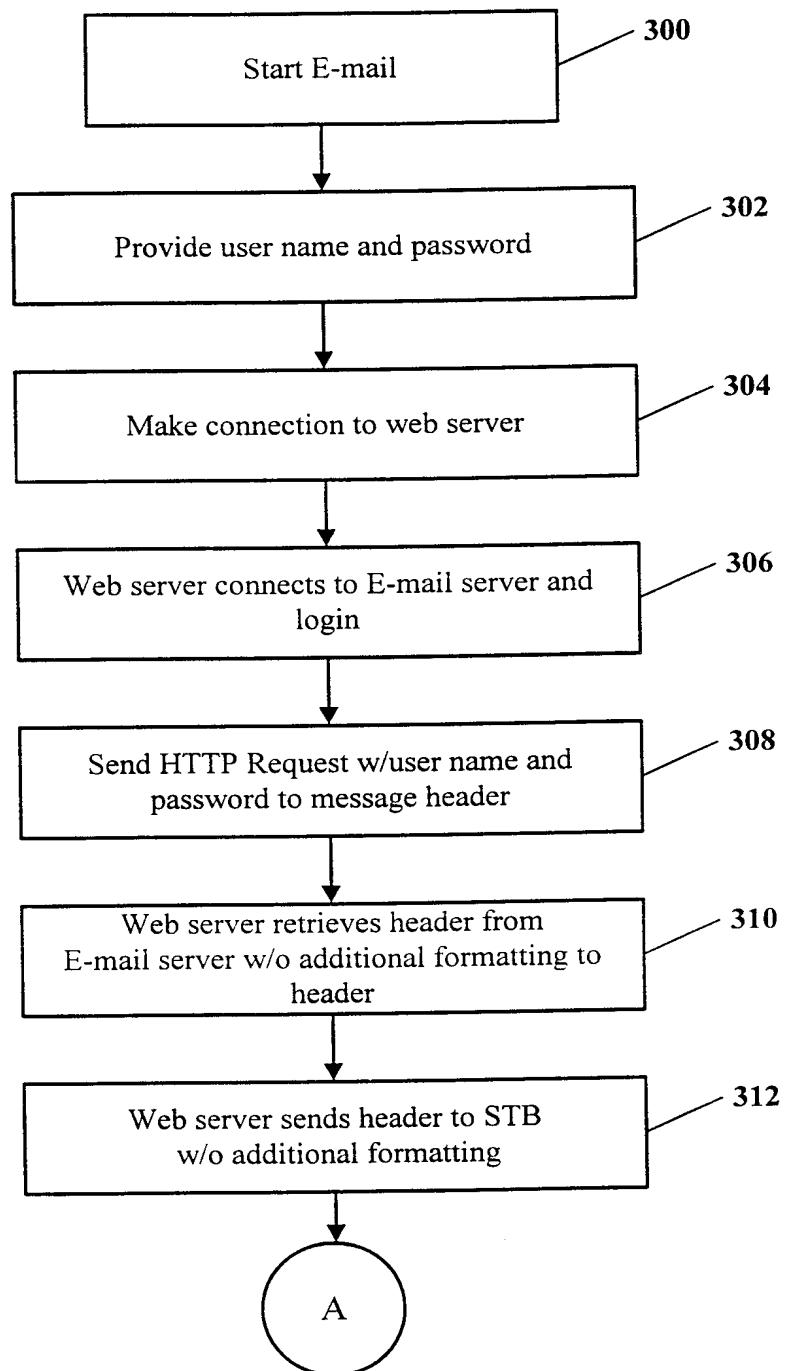


Figure 3A

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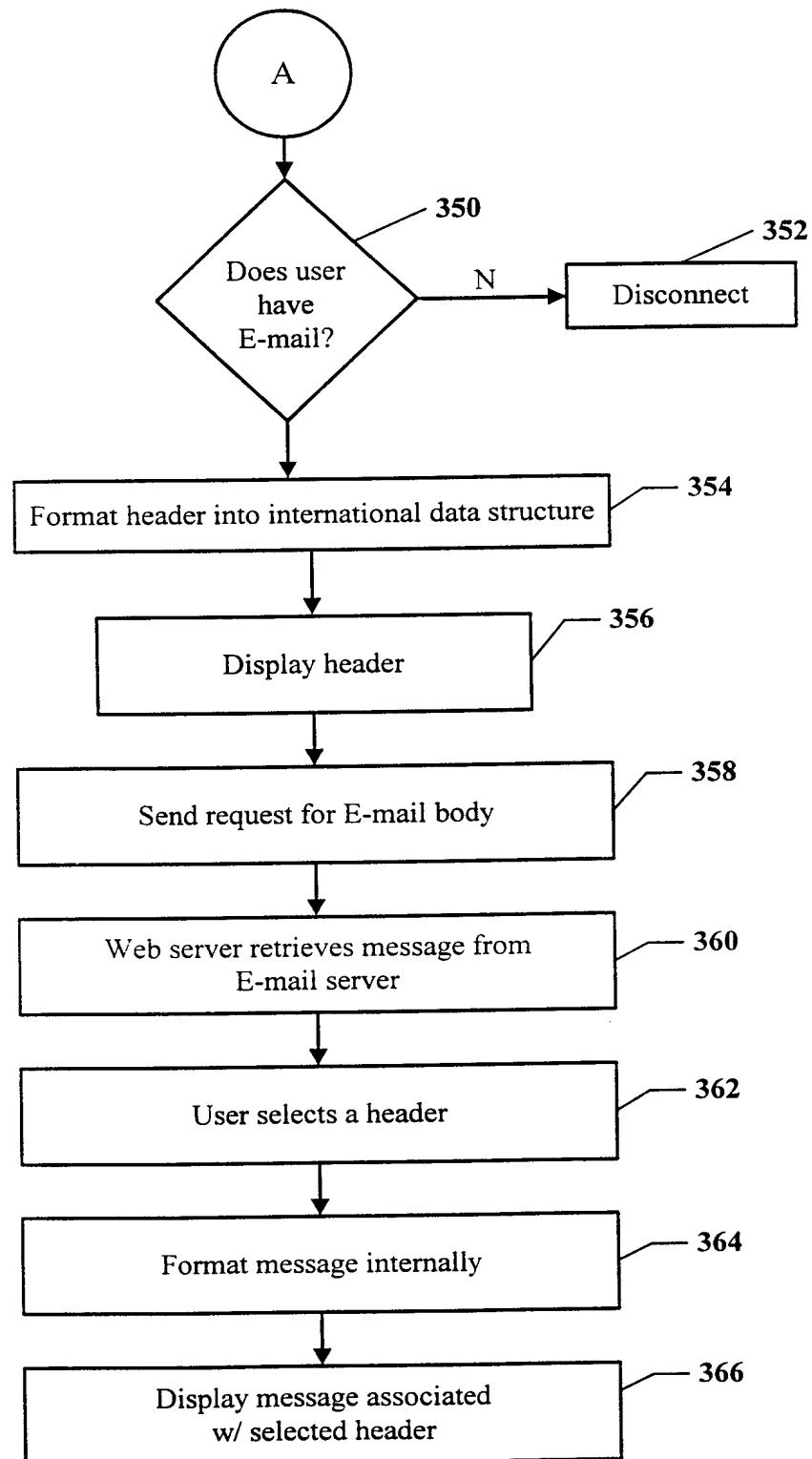


Figure 3B

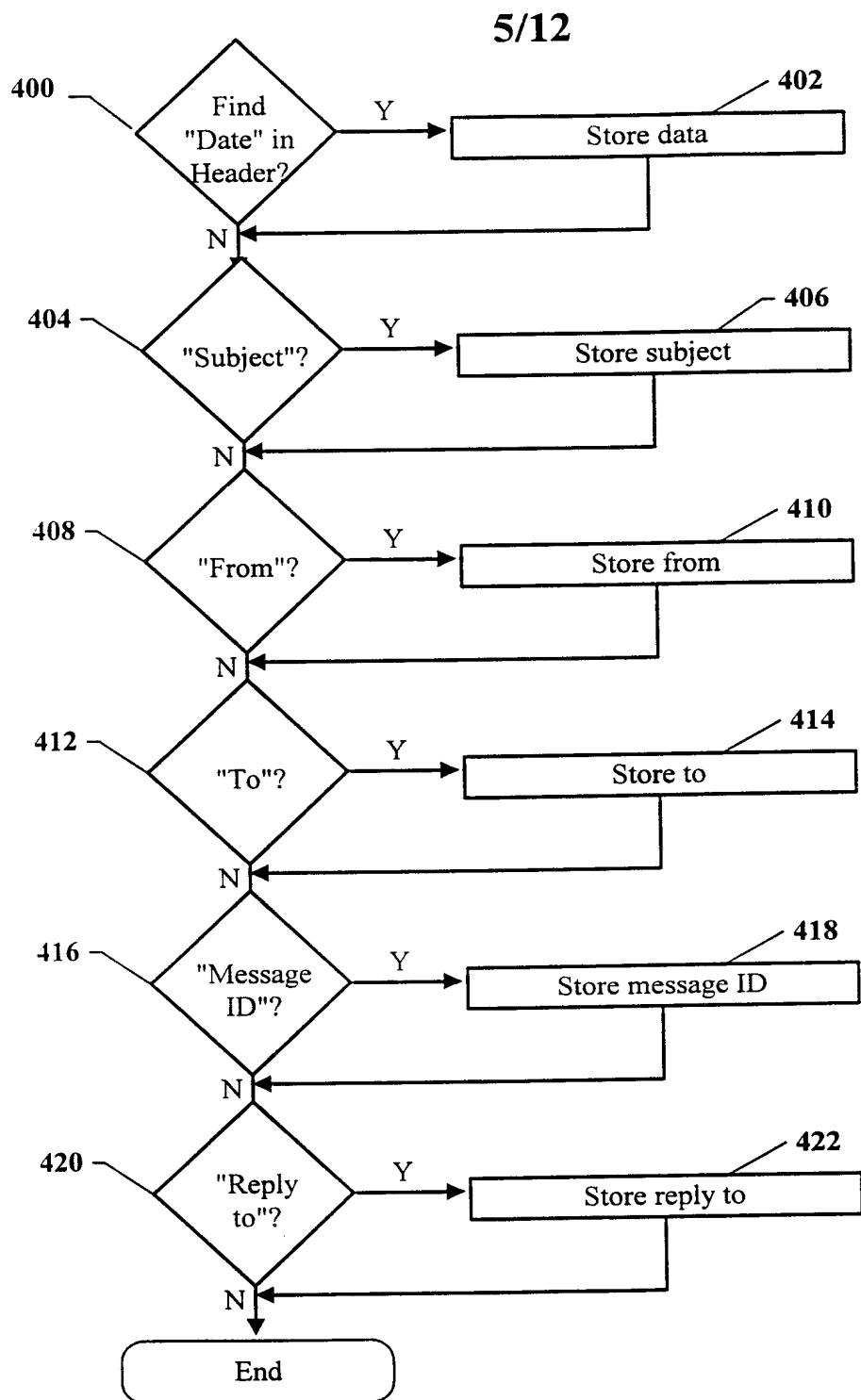


Figure 4

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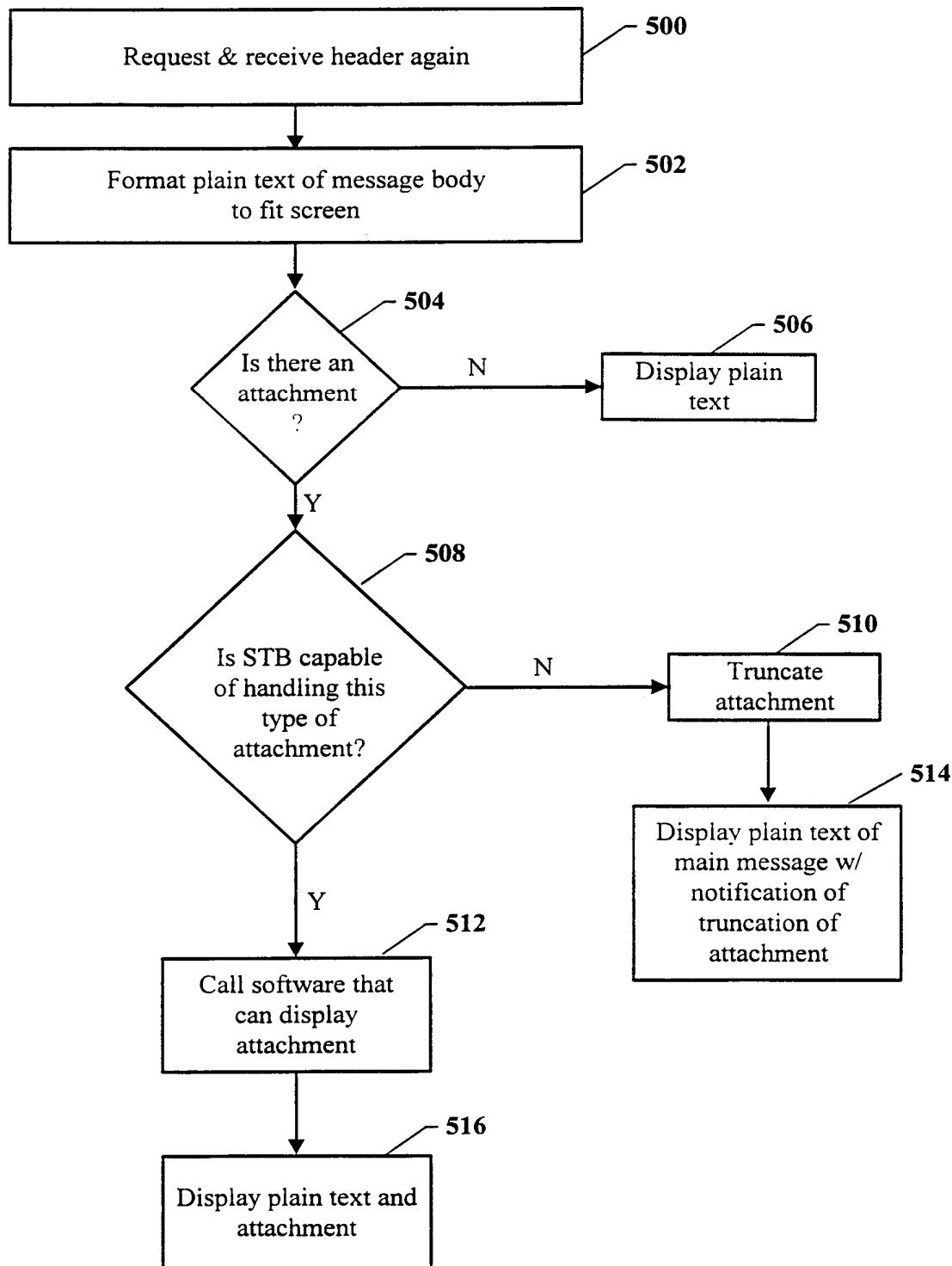


Figure 5

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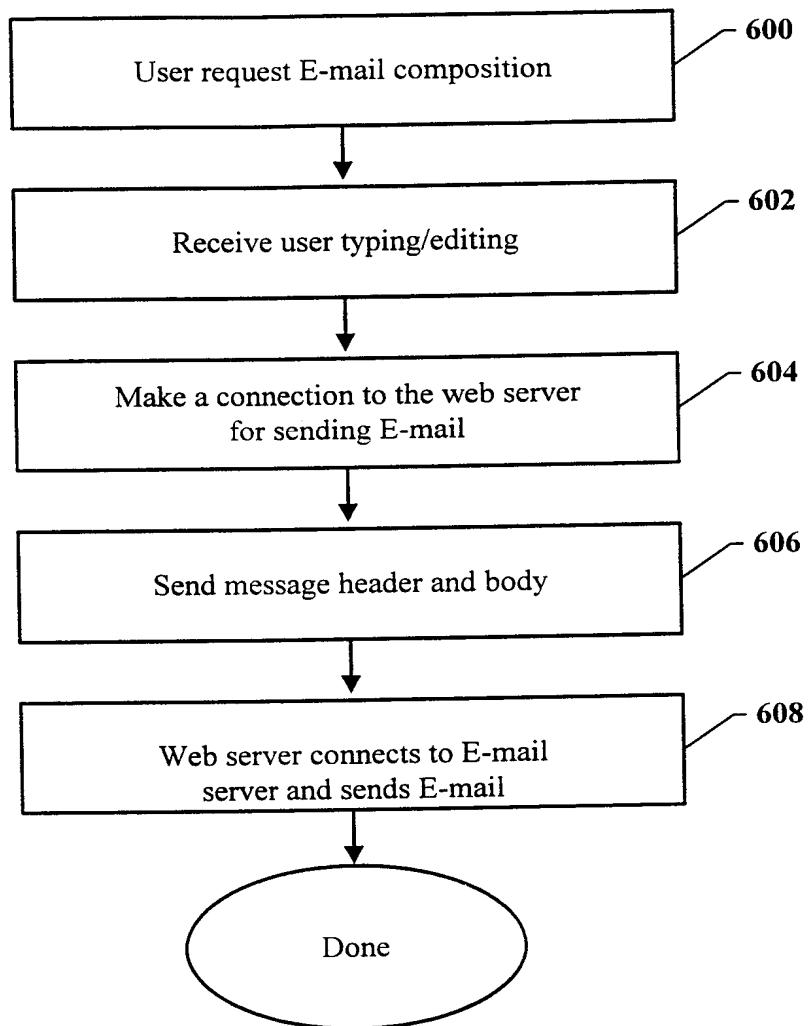


Figure 6

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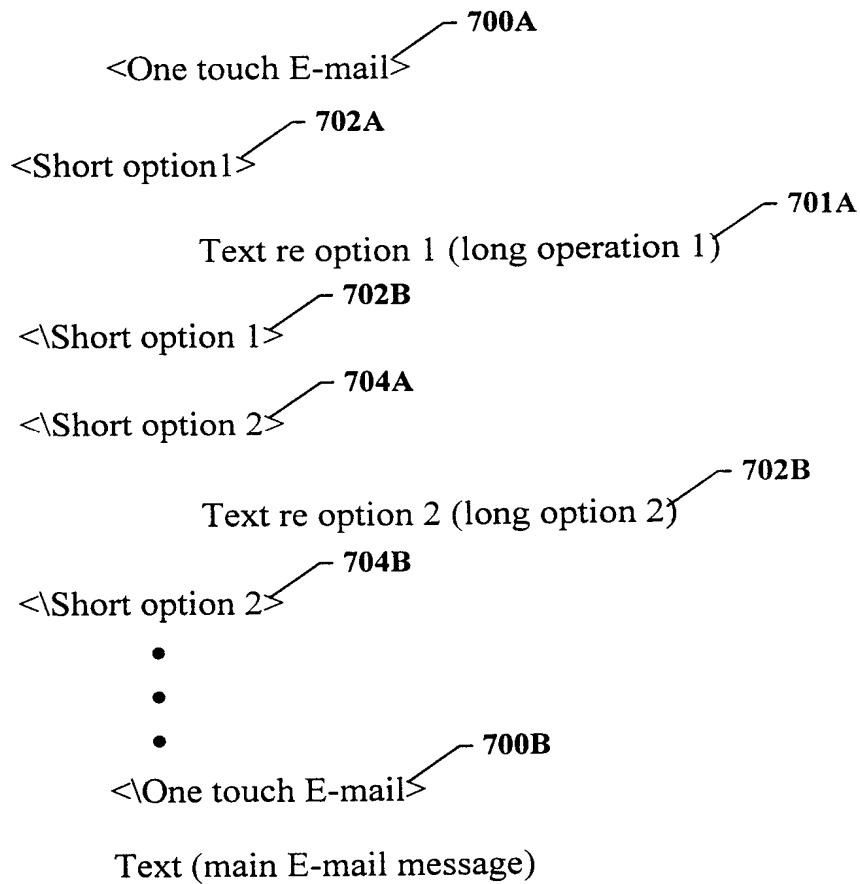


Figure 7

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Text [Main E-mail message]

1. Short option 1
2. Short option 2
3. Short option 3
- 
- 
- 

**Figure 8A**

**10/12**

Reply to: Orders@bookclub.com  
From: Customer  
Re: Gone With the Wind (Option #3)

This memorable book by . . .  
(Text describing Gone With  
the Wind)

Press another number for a corresponding  
option OR  
Press "0" to send this order

**Figure 8B**

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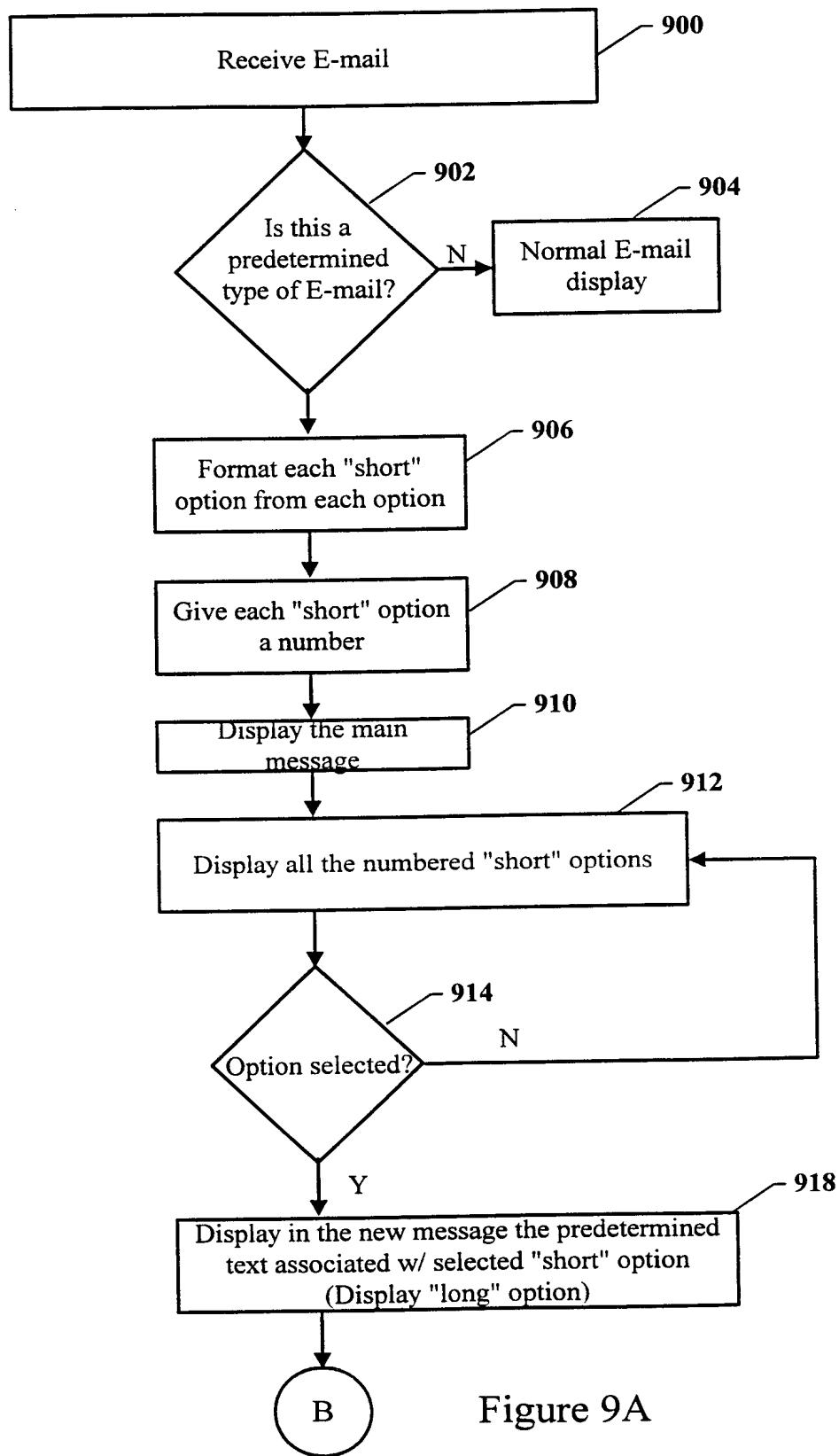


Figure 9A

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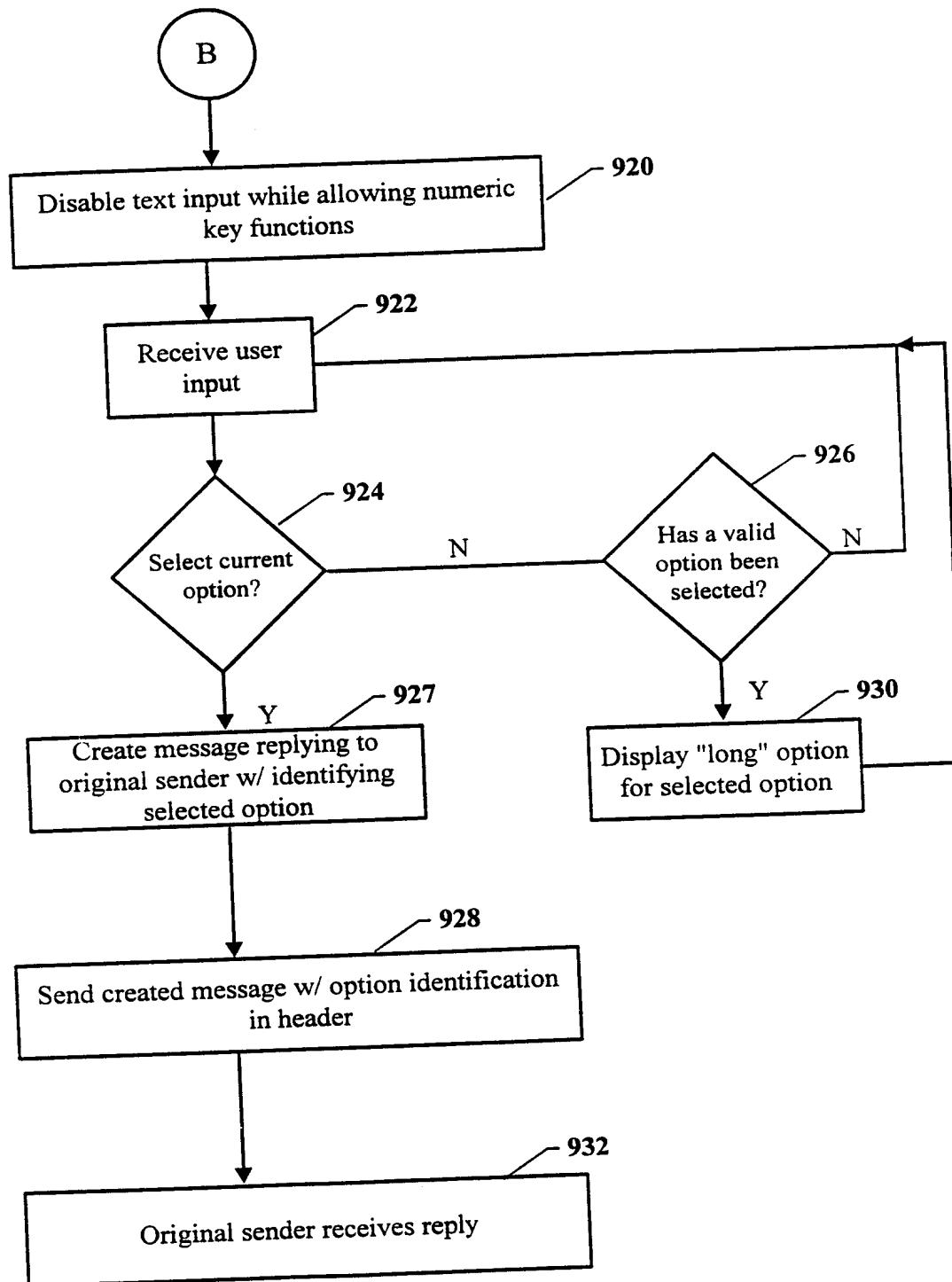


Figure 9B

## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US99/07751

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) : G06F 13/00, 13/12, 13/38, 15/02

US CL : 709/206, 207; 379/88.13, 93.19

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 709/206, 207; 379/88.13, 93.19

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

APS, West, Internet, EIC

search terms: email, electronic mail or electronic messages or remote control, mailbox or inbox

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5,632,018 A (OTORII) 20 MAY 1997, Figures 1 and 2, Col. 3, lines 1-67 and Col. 4, 1-67	1 and 10
Y	US 5,706,211 A (BELETIC et al.) 06 JANUARY 1998, Figures 1 and 2, Col. 2, lines 30-60, Col. 3, lines 7-65, Col. 5, lines 30-54, Col. 10, lines 45-67, Col. 11, lines 1-55	2-9 and 11-19
Y	US 5,487,100 A (KANE) 23 JANURARY 1996, Col. 5, lines 5-67 and Col. 6, lines 1-67	1 and 10
Y	US 5,504,519 A (REMILLARD) 02 APRIL 1996, Figures 3 and 5, Col. 3, lines 14-67, Col. 7, lines 5-30	2, 3, 11, and 12
Y	US 5,283,856 A (GROSS et al.) 01 FEBRUARY 1994, Figures 1, 10, Col. 5, lines 1-41, Col. 7, lines 1-67, Col. 8, lines 1-67	1, 4-10, 13-19

Further documents are listed in the continuation of Box C.  See patent family annex.

* Special categories of cited documents	*T*	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance		
"B" earlier document published on or after the international filing date	*X*	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"I" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	*Y*	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"O" document referring to an oral disclosure, use, exhibition or other means		
"P" document published prior to the international filing date but later than the priority date claimed	*&*	document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
29 JUNE 1999	12 JUL 1999

Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703) 305-3230	Authorized officer WILLIAM C. VAUGHN, JR. James R. Matthews Telephone No. (703) 305-3817
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## INTERNATIONAL SEARCH REPORT

International application No. PCT/US99/07751
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## C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5,561,709 A (REMILLARD) 01 OCTOBER 1996, Figures 3 and 6a, Col. 6, lines 30-65,	2, 3, 11, and 12
A	US 5,561,708 A (REMILLARD) 01 OCTOBER 1996, ABSTRACT	2, 3, 11, and 12
A	US 5,671,354 A (ITO et al.) 23 SEPTEMBER 1997, Figures 1, Col. 3, lines 50-64	
A	US 5,694,616 A (JOHNSON et al.) 02 DECEMBER 1997, ABSTRACT	1
A	US 5,414,773 A (HANDELMAN) 09 MAY 1995, Col. 5, lines 15-67 and Col. 1-55	1
Y	US 5,734,901 A (SIDHU et al.) 31 MARCH 1998, ABSTRACT, Col. 6, lines 42-67, Col. 7, lines 1-67, Col. 8, lines 1-67, Col. 11, lines 1-67 and Col. 12, lines 1-67	1, 4-10, 13-19
A	US 5,333,266 A (BOAZ et al.) 26 JULY 1994, ABSTRACT	1